EAAP 2013
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Sensitivity of beef cattle farms to weather hazards according to their forage systems

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Introduction

- Importance of grassland in suckler cow system
- Currently : a public fund compensates farmers in the event of agricultural calamities
- Replaced by private pasture yield insurance?
  - **Obj1: Quantify the impacts of grassland yield variability on farm production and on economic results**

- In theory diversification of forage systems decreases farm exposure to weather risks and enhance flexibility
  - **Obj2 : Is variability reduced in farms with forage crops or silage grass?**

Method

- Descriptive analysis of real farm data

- Indicator of pasture yield variation =
  variation of the total quantity of grass harvested
  by livestock unit relative to farm average value

- Farm typology of forage system
  - « Forage crop » : forage crops > 1% of forage area
  - « silage » : silage represents more > 15% of the pasture area harvested in 1st cut
  - « hay only »

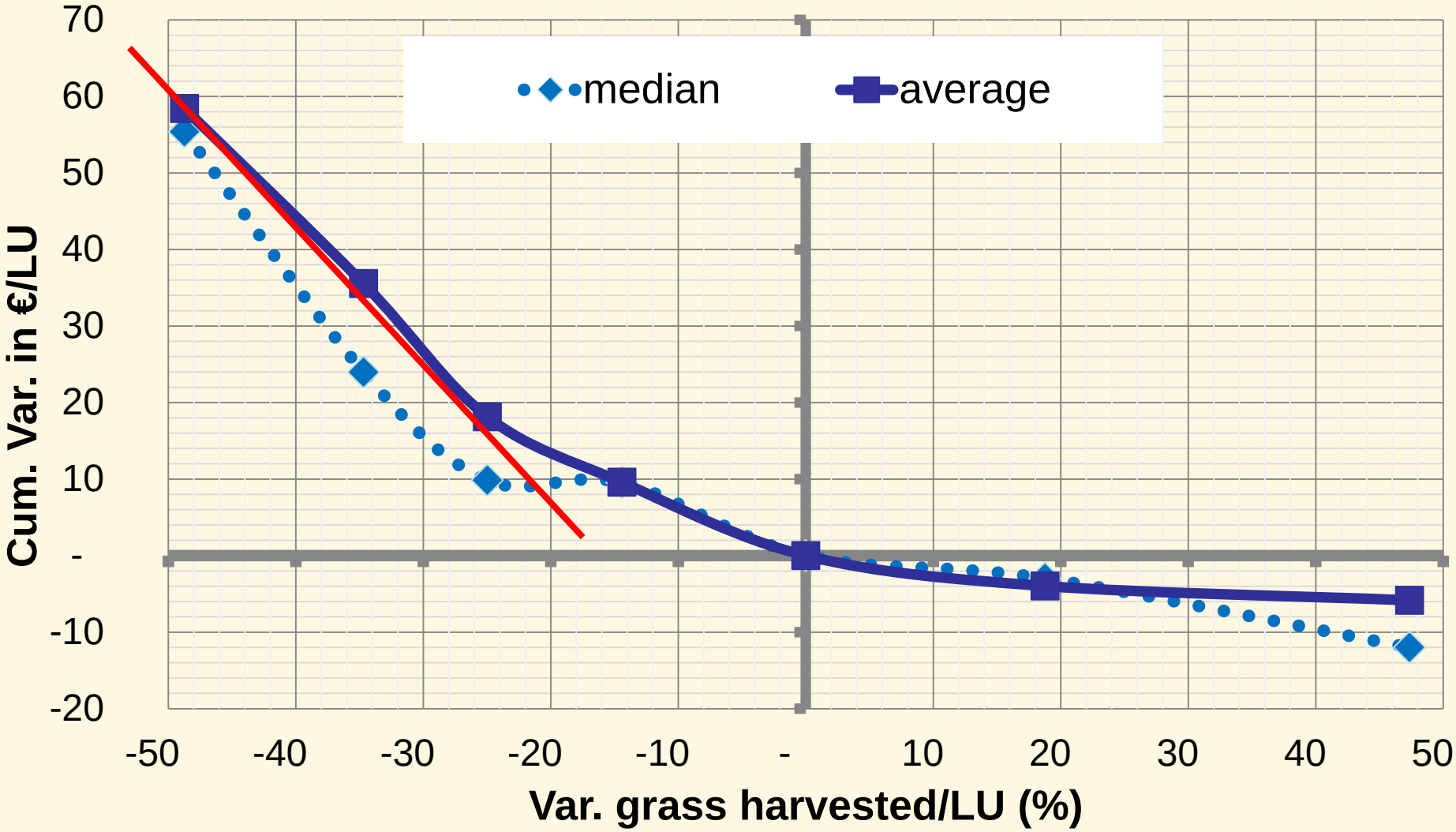
Data

- French national panel data base from « Réseaux d'élevage »
  - Economic and technical Farm Data over the period 2000-2009
- Farm re-sampling
  - Farm present > 5 years
  - Regions where the three forage systems are present
  - Farm specialized in beef production and selling mostly lean males

	Forage Crop	grass silage	Hay	total
Nb of observations	627	464	444	*1535*
UAA (ha)	129	128	125	*128*
Livestock Unit	128	124	100	*119*
forage crop (% forage area)	6	0	0	*3*
male fattening (%)	24	11	14	*18*

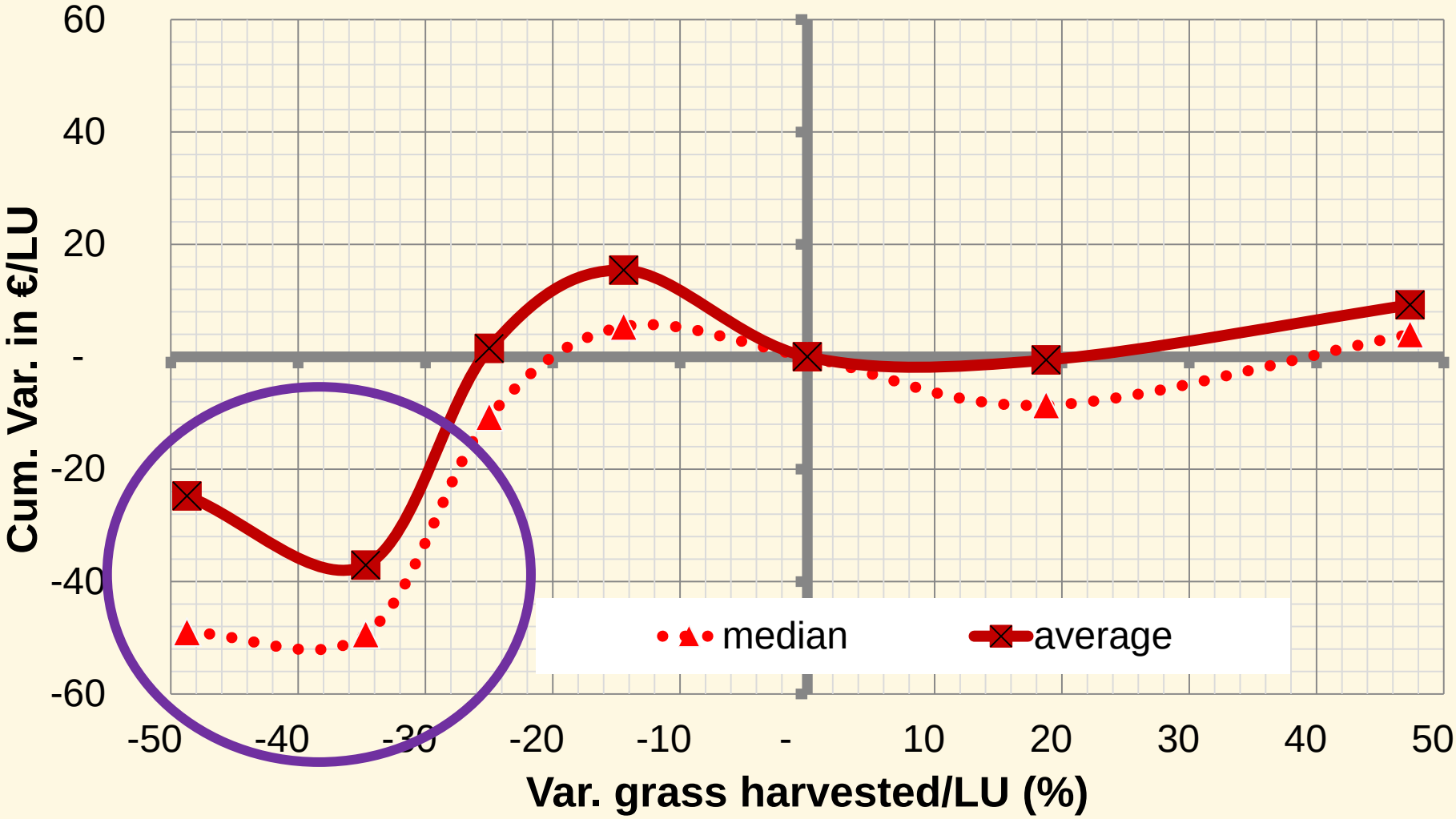
Results: impact of grass production variation

- Cumulated variation of **production costs** (€/LU)



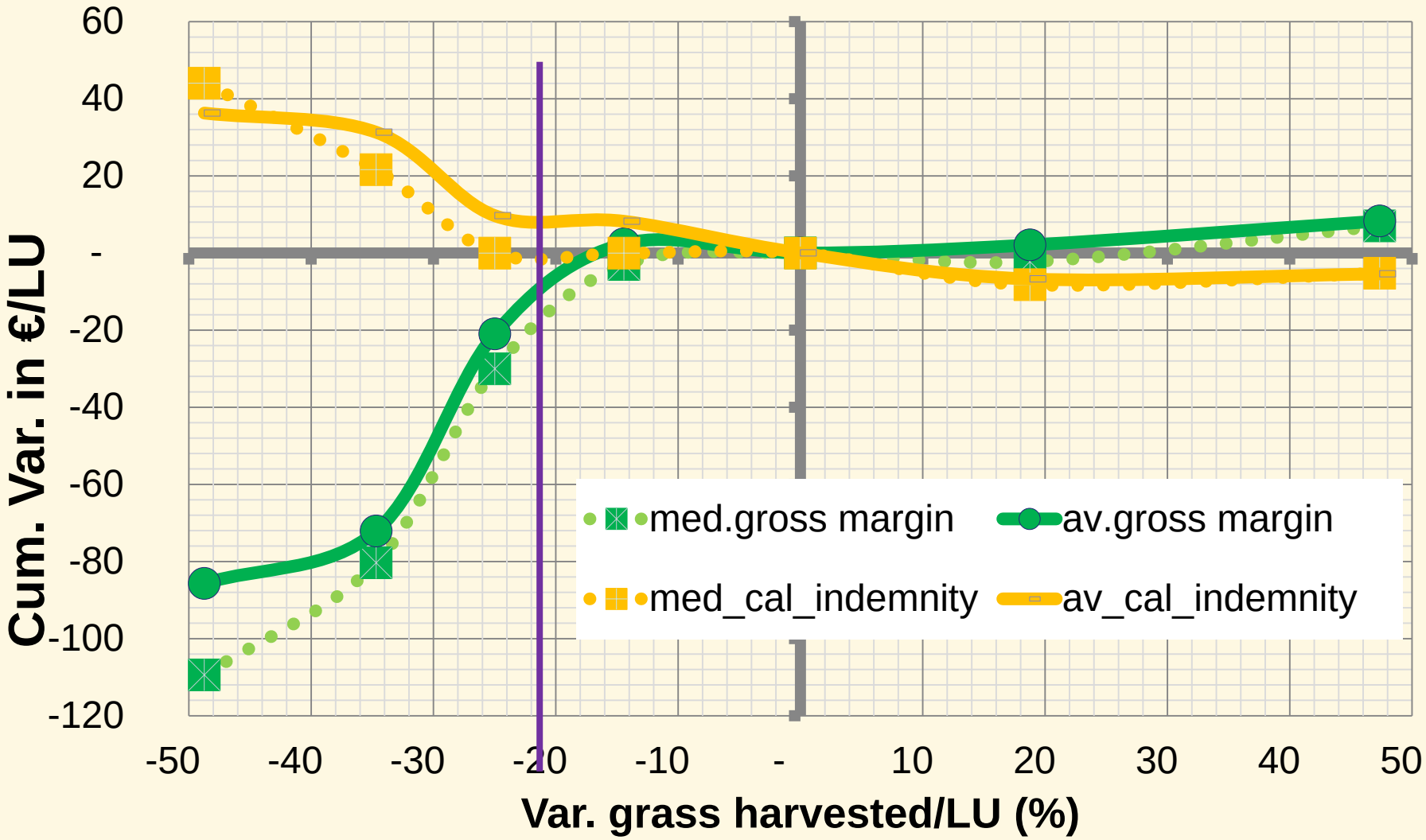
Results: impact of grass production variation

- Cumulated variation **of animal and forage area receipt** (€/LU)



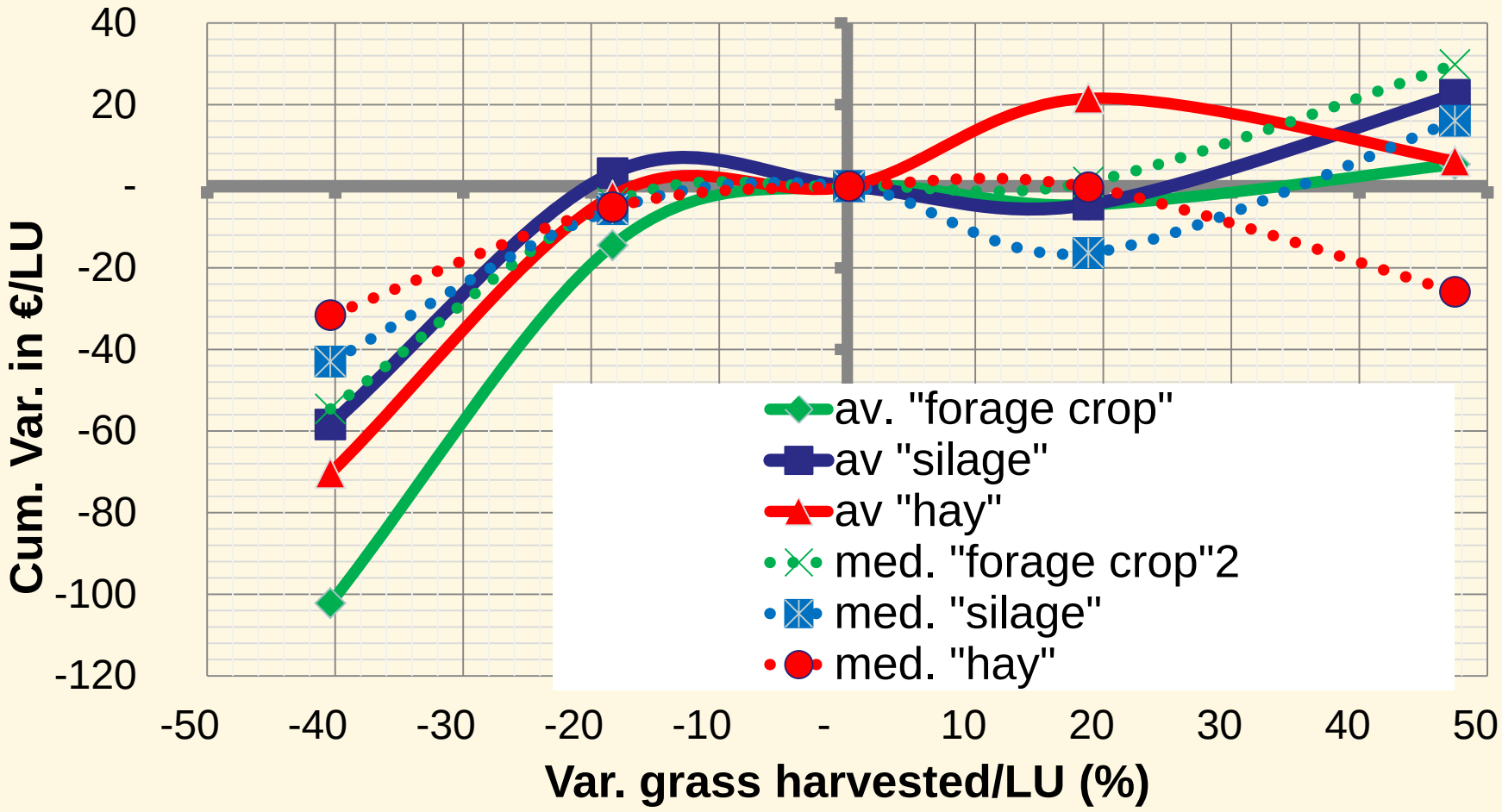
Results: impact of grass production variation

- Cumulated variation of **gross margin** (€/LU)



Results : differences between forage systems

- Cumulated variation of **gross margin** (€/LU)



Results : differences between forage systems

	Average			Inter annual Standard deviation		
	Forage crop	Silage	Hay only	Forage crop	Silage	Hay only
Receipt /LU	639	647	573	78	75	84
Op. cost/LU	288	285	209	46	48	42
GM/LU	351	362	365	82	80	87
Net profit/ WU	18 516	17 737	23 038	11 195	10 981	14 428

Note: Tukey test : significantly highest and lowest value at 5% confidence

Conclusion : main results

- Pasture yield variability

➢Economic resilience of suckler cow farm for variation of grass harvested per LU above -20%, but important impact below -20%

- Forage system

-No clear advantage of forage crops and silage grass in reducing exposure to risk nor in improving average economic result

Conclusion : limits and perspectives

- Limits
  - Importance of overall variability : structural farm changes, price variability, market crisis
  - Accuracy of grass production estimation by farmers ?
  - Sensitivity of variation of grass **produced** per ha?

- Perspective
  - Differences of sensitivity between regions, farm size, forage stock..?
  - Methodology :
    - More integrative econometric methods
    - Mathematical programming model

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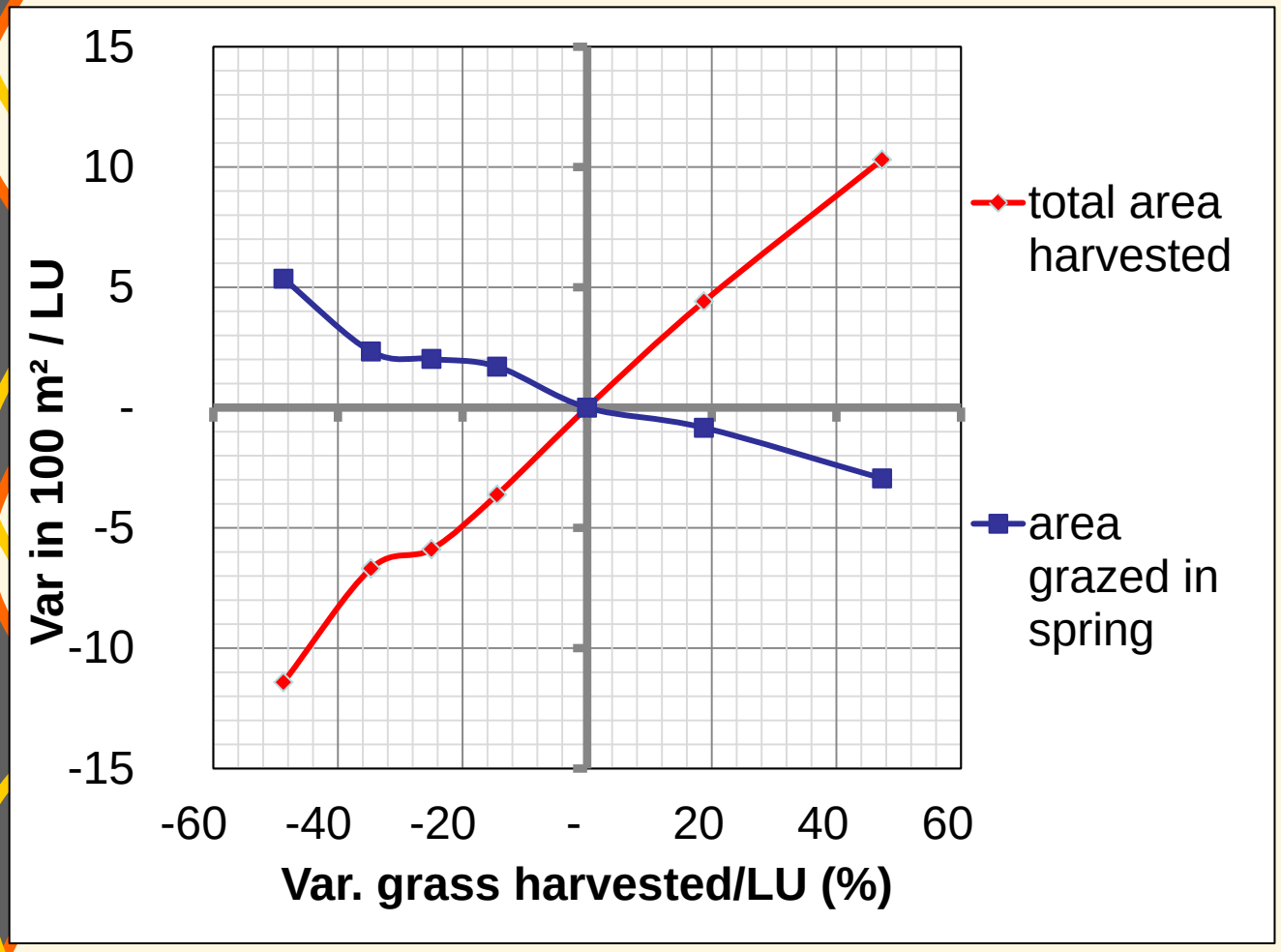
Results : 2) differences between forage system

	Average			Interannual s.d.		
	Forage	Silage	Hay only	For	Sil	Hay
area of grass harvested (are/LU)	40	50	49	9	12	9
Forage purchased /LU				139	196	154
Concentrate feed	549	621	435	129	138	125
Animal production /LU)	298	296	276	25	23	23

Note: Tukey or Levene test : significantly highest and lowest value at 5% confidence

Results: 1) Quantifying impact of interannual variation of grassland production

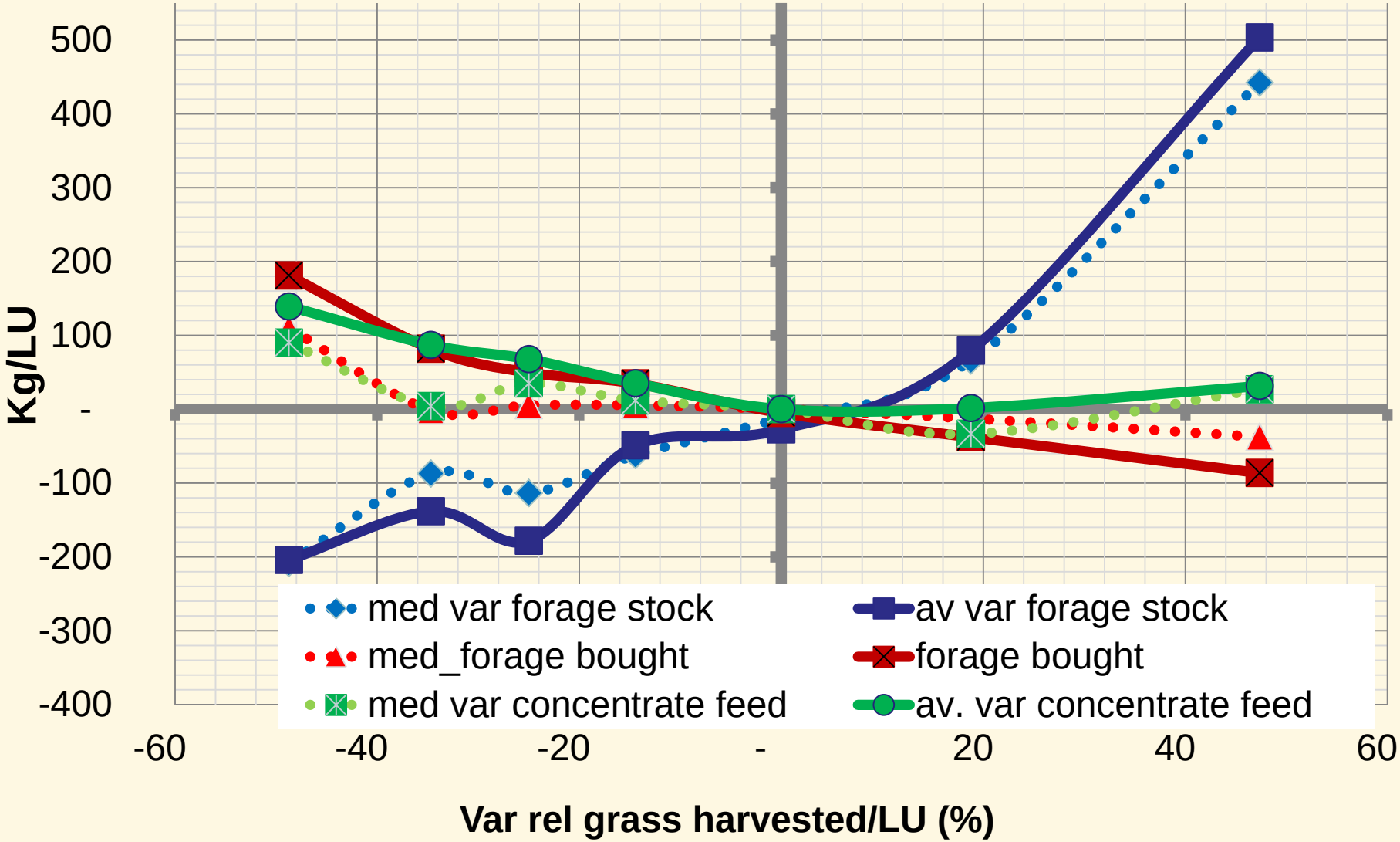
- 1) adjustment of pasture area end-use



➢grazing is prefered over haymaking when grass production decrease

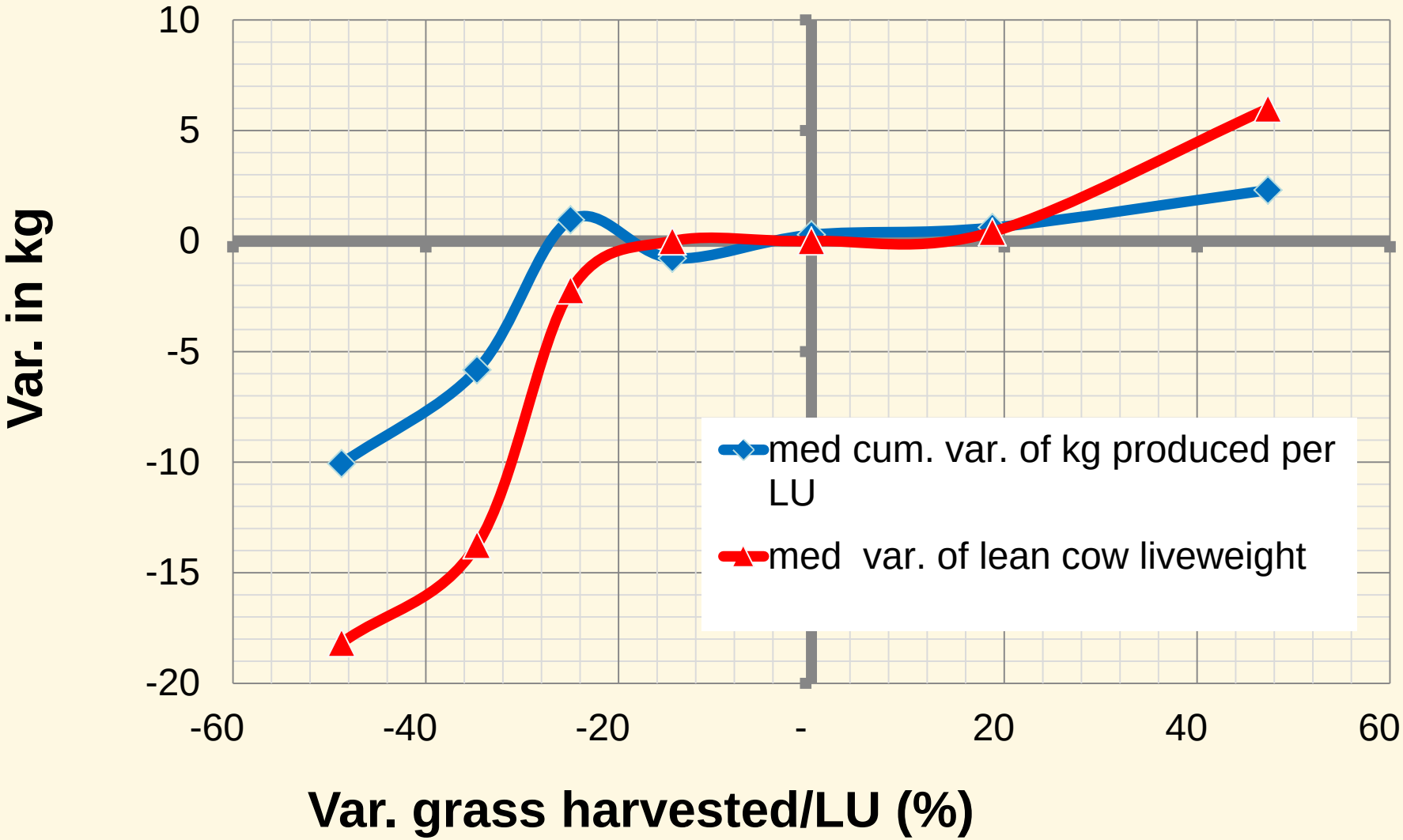
Results: impact of grass production variation

- *cumulated variation of **animal feeding source** in kg / LU*



Results: impact of grass production variation

- Variation **of animal production (kg)**



Results : 2) differences between forage system

- Farm structures

	Forage Crop	grass silage	Hay
Nb of observations	627	464	444
UAA (ha)	129	128	125
Worker Unit	1.8	1.9	1.5
Livestock Unit	128	124	100
LU/ha Forage area	1.27	1.16	1.05
commercial crop (%)	17	14	19
forage crop (%)	6	0	0
male fattening (%)	24	11	14

Note: Tukey HSD test : significantly highest and lowest value at 5% confidence

Results : 2) differences between forage system

	Average			Interannual s.d.		
	Forage	Silage	Hay only	For	Sil	Hay
area of grass harvested (are/LU)	40	50	49	9	12	9
Forage harv. (kg/LU)	2 147	1 899	1 822	399	447	504
Forage purchased /LU				139	196	154
Concentrate feed	549	621	435	129	138	125
Animal production /LU)	298	296	276	25	23	23